is twenty-five yards thick. Although brine springs had been known and worked as early as the time of the Norman Conquest or earlier, yet the bed of rock salt was only discovered in 1670 when searching for coal at Marbury, about a mile to the north of Northwich. During the last 200 years this rock salt has been worked, or to speak more correctly, for more than a century the upper bed was worked, when an agent of the Duke of Bridgewater sank lower still, and, after passing through about ten yards of hard clay and stone, with small veins of rock salt running through it, the lower bed of rock salt was discovered. This lower bed is between thirty and forty yards thick, but only about five yards of the purest of it is "got." This good portion lies at a depth of from 100 to 110 yards, according to the locality. In the neighbourhood of Winsford both beds are met with at a much greater depth. The whole of the rock salt obtained is got now from the lower bed, and last year it reached nearly 150,000 tons, probably the largest quantity ever obtained in one year. It may as well be said that this mining of rock salt has had nothing whatever to do with the subsidences spoken of, though the wording of the note would lead readers to expect the contrary. At present there is no danger to be expected from the lower bed of rock salt. The whole danger arises from the upper bed, as will be seen from the following account:—The salt trade of Cheshire is a very extensive one, and during the year 1871 upwards of 1,250,000 tons of white salt have been sent from the various works in that county. The whole of this immense quantity has been manufactured from a natural brine which is found in and around Northwich and Winsford, as well as in several other smaller places. This brine is produced by fresh water finding its way to the surface of the upper bed of rock salt, technically called the Rock Head. The fresh water dissolves the rock salt, and becomes saturated with salt. The ordinary proportion of pure salt in the brine is 25 per cent. To obtain the quantity of salt above mentioned, it would be necessary to pump 5,000,000 tons of brine. The pumping of brine is incessantly going on, and as a natural consequence the bed of rock salt is being gradually dissolved and pumped up. As the surface of the salt is eaten away, the land above it subsides. This subsidence is not spread over the whole surface, but seems to follow depressions in it, thus forming underground valleys with streams of brine running to the great centres of pumping. Wherever a stream of brine runs, there the subsidence occurs, and in many localities the sinking is very rapid and serious, but fortunately is almost always gradual and continuous. An immense lake, more than half a mile in length, and nearly as much in breadth, has been formed along the course of a small brook that ran into the river Weaver, and this lake is extending continually. Besides this gradual continuous sinking, which affects the town of Northwich very seriously, causing the removal and rebuilding of houses or the raising of them by screw-jacks in the American fashion, the raising of the streets and so on, there is a sudden sinking of large patches of ground, leaving large deep cavities such as described in your Note. These latter are more terrifying and dangerous. They are in the majority of cases caused by the falling-in of old disused mines in the upper bed of rock salt. These old mines were worked so as to leave but a thin crust of rock salt between the superincumbent layers of earth and the mines. The roof of the mine is supported by pillars of rock salt at intervals. Of course the weakest and most dangerous point is the old filled-up shaft. As most of these mines have been disused for nearly a century, the position of the old shafts is unknown. When the brine has eaten away the layer of rock salt left as a roof, the whole of the earth lying above falls into the mine, and an enormous crater-like hole, some 100 feet or more in depth, is formed, which in process of time becomes filled up with water, the mine itself being choked with earthy matter. In the immediate neighbourhood of Northwich there are a great number of these rock pit holes, as they are called, and it is nothing very unusual for one to fall in.

The rock miners, as they are called, were at work in the lower mine last year when one of these sudden subsidences occurred. They knew nothing of it. I have been myself under this hole, and it was a fearful one to look at when it first went in. There is no communication between the upper and lower beds, and the miners have about thirty yards of hard clayey stone and rock salt between them and the upper old mines. The subsidence more particularly alluded to in your Notes is not in the immediate neighbourhood of Northwich, but rather midway between Northwich and Winsford, near Marton Hall. It is rather difficult to know what is its cause, as there is no record of any mines ever being worked in that neighbourhood. The general belief is that the rock salt, which undoubtedly underlies the whole neighbourhood, has been gradually dissolved, and that a sinking has commenced as at Northwich; then that, owing to some peculiarity of the particular overlying strata—probably to their sandy nature, as quicksands are known to exist about Northwich—the earthy and sandy matter of the immediately overlying strata has been carried away by the brine streams till a large hollow has been formed. This has continued till the superincumbent mass could not be borne up any longer, and thus suddenly fell in, filling up the lower cavity, but opening a large crater-like pit from the surface.

A Government inspector has been to the neighbourhood, and his report is expected very shortly.

The whole neighbourhood of Northwich is well worthy of more attention than it has received, and it is surprising that our geologists have not been able to give a better account of the rock salt formation than has yet been done.

THOS. WARD

NOTES

WE are glad to be able to state that the severe sentence passed upon M. E. Reclus has been changed, in consequence of the representations of the scientific men of this and other countries, into the comparatively mild one of exile from France.

WE understand that the Chair of Anatomy in the new German University of Strasburg has been offered to, and declined by, Prof. Gegenbaur, who has done so much to raise the scientific reputation of the University of Jena. A similar offer has also been made to Gegenbaur's distinguished colleague, Haeckel, the result of which is not yet announced.

THE Master and Senior Fellows of St. John's College, Cambridge, have elected Mr. J. B. Bradbury, M.D., of Downing College, Linacre Lecturer in Medicine in the room of Dr. Paget, who has been elected Regius Professor of Physic.

THE Royal Commission on Scientific Instruction and the Advancement of Science recommenced their sittings yesterday.

THE two Smith's Prizes of the University of Cambridge have been this year awarded to the First and Second Wranglers respectively.

WE regret to learn that the Australian Eclipse Expedition has proved a failure, through the unfavourable state of the weather at the point of observation.

IT is with great regret we have to record the death on Wednesday, January 31, at Torquay, of Dr. G. E. Day, F.R.S., late Chandos Professor of Medicine in the University of St. Andrew, at the age of 56. Our columns have borne frequent evidence of the extent of Dr. Day's acquirements in many branches of

Natural History. He was one of the founders of the Pathological and Cavendish Societies.

THE name of Colonel Chesney, F.R.S., of the Royal Artillery, who died on Tuesday, the 30th ult., at his residence near Kilkeel, Co. Down, Ireland, in the 83rd year of his age, was almost more familiar to the last generation than to this. Among his various titles to eminence as traveller, *savan*, and military critic, he will be chiefly known as "the pioneer of the overland route to India." It is now nearly forty years since General, then Captain, Chesney returned from his explorations of the Euphrates for the purpose of establishing steam communication with India *viâ* Egypt and Asia Minor, to ask the Government to give him the command of an expedition. The demand was granted; two vessels, the *Tigris* and the *Euphrates*, were placed at his disposal. The indefatigable manner in which he prosecuted his scheme, in the face of many disappointments and discouragements, is well known. He has himself written the history of his travels and adventures; and the lines of communication now in existence bear witness to the practical value of his projects. General Chesney has for many years back enjoyed the repose which was the fitting reward of much arduous toil; and now leaves behind him the record of a useful, honourable, and well-spent life.

DR. WILLIAM BAIRD, F.R.S., whose death we recorded last week, after a long and painful illness, was born at Eccles, in Berwickshire, in the year 1803, educated at Edinburgh, and received in 1823 an appointment as surgeon from the East India Company. While in this office he visited India, China, and many other countries, the natural history of which he carefully studied. In 1831 he published a paper "On the Luminosity of the Sea," in *Loudon's Magazine of Natural History*, and from that time became a frequent contributor to the scientific journals, more especially to the "Transactions" of the Berwickshire Naturalists' Club. In 1838 he compiled a Cyclopædia of the Natural Sciences. In September 1841 he was appointed an Assistant in the Zoological Department of the British Museum, which office he filled till his death. In 1851 his monograph on the British Entomostracous Crustacea, a work of great ability and research, was published by the Ray Society. Between the years 1838 and 1863 he contributed a number of papers on the Entomostraca to the "Annals of Natural History," and the "Proceedings" of the Zoological Society. During the latter years of his life his attention was principally given to the Entozoa, of the then known species of which he had as early as 1843 drawn up a catalogue, which was published by the trustees of the British Museum. Numerous papers on the same subject were also contributed by him to the "Proceedings" of the Zoological Society, the "Transactions" of the Linnean Society, &c. Latterly he was engaged in preparing a general catalogue of the Entozoa, for which he had accumulated a vast amount of material. His knowledge of some other branches of natural history was equally extensive and profound, and his death will leave a gap among those who were acquainted with his varied acquirements, and the courtesy and readiness to assist displayed to all who sought his help or advice.

THE *Academy* records the death of Prof. Trendelenburg, of Berlin, who had attained a two-fold eminence as a philologist and Aristotelian commentator, and as an original thinker.

THE Waynflete Professorship of Chemistry at the University of Oxford, will shortly become vacant by the resignation, through ill-health, of Sir Benjamin Collins Brodie, Bart., M.A. The Waynflete Professorship of Chemistry was directed by the ordinance of the University Commissioners of 1854, relating to Magdalen College, to be founded in that college in lieu of certain prælectorships mentioned in its ancient statutes, and to be maintained by a stipend of 600*l.* per annum. The Professor is elected by the Chancellor of the University, the Visitor and President of the College, and the Presidents of the Royal Society and of the College of Physicians. Prof. Brodie was elected in 1865, and was the first professor under the new ordinance, having previously resigned the Aldrichian Professorship of Chemistry, which he had held since the resignation of the late Dr. Daubeny, and which chair was suppressed in 1866, the revenues being applied to the payment of a salary of a Demonstrator, and to the purchase of chemical apparatus or other means towards the study of chemistry in the University.

IN the *Gazette of India* is the following tribute to the memory of the late Archdeacon Pratt:—"The Governor-General in Council has received with deep regret official intimation of the death of the Venerable the Archdeacon of Calcutta, the Reverend J. H. Pratt, on the 28th ultimo, at Ghazeepore, in the North-Western Provinces. The Governor General in Council cannot allow the death of Archdeacon Pratt to pass unnoticed by the Government which he served so long and so well. Mr. Pratt entered the service in the year 1838, and was appointed Archdeacon of Calcutta by the late Bishop Wilson on the 6th October, 1849. Under the ordinary rules of the service, Mr. Pratt would have retired in October, 1867, but so efficiently had he filled his high office in the Church, that he was solicited by Government, with the full approval of Her Majesty's Secretary of State, to continue to hold it. In adopting this course the Government was moved not only by its own appreciation of the Archdeacon's services, but the strong recommendation of the late Bishop Cotton, who bore testimony to Archdeacon Pratt's eminent scientific attainments and university distinctions, to the active part which he had taken in the management of the diocese, and in the promotion of all good works, and to his personal piety and high Christian character. At a later date Her Majesty's Secretary of State, in sanctioning the retention of Archdeacon Pratt in the service until October 1872, remarked:—'I cannot refrain from expressing the high sense I entertain, in common with the present Bishop of Calcutta, the Lieutenant-Governor of Bengal, and your Excellency in Council, of the zeal and ability with which he has for so many years faithfully and laboriously discharged the duties of his Office.' The Governor-General in Council feels assured that the death of the Venerable Archdeacon will be mourned by the entire Christian community in India."

IT is announced that Professor Flower will commence his annual Hunterian Lectures on Comparative Anatomy in the Theatre of the Royal College of Surgeons on Friday, the 16th inst., at four o'clock. The lectures will be continued at the same hour every Monday, Wednesday, and Friday until the 27th of March. The subjects to be embraced by the present course are the modifications of the organs of digestion, including the mouth, tongue, salivary glands, alimentary canal, liver, and pancreas. These will be treated of in detail in the various animals composing the class Mammalia, and if time should permit, a review of the principal variations of the same parts in the other Vertebrata will follow. The lectures will be illustrated as fully as possible by specimens from the Museum, and by diagrams, and it should be added, are open without fee to any gentleman presenting his card at the door.

THE *Times of India* calls attention to the very scant recognition which literary or scientific merit has received in conferring the distinction of the Star of India. Although the Order of the Star of India was established for the reward of good service of every kind, and the soldier, the civilian, the diplomatist were not considered, on the institution of the Order, to have any better claim to the decoration than the man of science or the man of letters, yet on the list there is at the present time scarcely a single representative of literature, science, or art. The *Times* strongly commends the claims of Dr. Forbes Watson and Dr George Smith to this distinction, for the admirable work done in bringing the English public face to face with the arts and manufactures of the East, services which have as yet received no recognition whatever from the Crown.

THE brilliant display of the aurora borealis, seen in London on Sunday night, of which various accounts will be found in our columns, appears to have been observed in France, as well as in Wales. Scotland, and Ireland. The phenomenon was seen in Turkey and also in Egypt. A telegram from Alexandria says that a large space of sky was illuminated for five hours. The report of the Meteorological Department on Monday notices the wide extent of the display, and adds, "a considerable change in the weather seems likely."

AT his inauguration as Rector of the University of Edinburgh on Monday last, Sir Wm. Stirling-Maxwell is reported to have made the following pertinent observations on the medical education of women :—"He was in favour of teaching women everything that they desired to learn, and for opening to them the doors of the highest oral instruction as wide as the doors of book-learning. As to medical education, he said that so long as women would minister to their sick children and husbands, he must hear some argument more convincing than he had yet heard why they were to be debarred from learning the scientific grounds of the art of which they were so often the empirical practitioners, or the docile and intelligent instruments."

THE *Academy* for February 1 contains a reply, by Prof. Helmholtz, to Prof. Jevons's article on "The Axioms of Geometry," in our issue for October 19.

WE learn from the *British Medical Journal* that the Brown Institution for Sick Animals is likely to commence at once a work of great public utility. Aided by a handsome grant from the Chambers of Agriculture, Profs. Sanderson and Klein, and Mr. Duguid, will undertake an extended series of observations on the treatment and comparative pathology of pleuro-pneumonia, an epizootic which commits the most costly ravages among our herds.

"JUSTICES' Justice" has become a proverb. Here is a sample of justices' science :—At Chelmsford the county magistrates declined to grant the use of the Shire-hall for a lecture on the sun, illustrated by experiments in spectrum analysis, on the ground that the electric light might endanger the safety of the building!

THE *American Naturalist* for January reprints a correspondence between the Commissioner of Agriculture for the United States' Government, and Prof. Asa Gray, and other botanists, respecting the dismissal of Dr. C. C. Parry from his office of botanist to the department, which appears to have been performed in a very summary manner, and on slight grounds.

MR. M. C. COOKE, the well-known mycologist, announces his intention, if the names of a sufficient number of subscribers can be obtained, to issue monthly a small journal, with illustrations, devoted absolutely to Cryptogamic Botany. It will serve as a sort of Appendix to the Lichen and Fungi Floras recently published, by recording and describing new species as they are found. Although British Cryptogamia will occupy the first place, it is intended to record from time to time what is doing abroad in all the Cryptogamic families (except ferns), and to keep the student acquainted with what is being published in foreign countries as well as his own. Monographs of genera and families, critical observations on species, and all kindred subjects, will receive attention. The co-operation is promised of the Rev. W. A. Leighton, Dr. Lauder Lindsay, Dr. Braithwaite, F. Kitton, and other specialists.

THE *Journal of Botany* states that a re-issue is in course of preparation of Lindley and Hutton's "Fossil Flora of Great Britain," originally published in 1837, and now very scarce. A supplementary volume will be added by Mr. Carruthers, which will contain a critical revision of the species in the original book, and figures and descriptions of all the important additions to fossil botany made during the last thirty-five years.

A CLEVER application of science to commercial purposes has been made by an Italian gentleman, M. Eugenio de Zuccato, of Padua. By means of the invention any number of copies of a manuscript or design, traced upon a varnished metal plate, may be produced in an ordinary copying press. The *modus operandi* is very simple. To the bed and upper plate of a press are attached wires leading from a small battery, so that when the top of the instrument is screwed down the two metal surfaces come into contact, and an electric current passes. An iron plate resting upon the bed of the press is coated with varnish, and upon this surface is written with a steel point any communication it is desired to copy. The letters having thus been formed in bare metal, a few sheets of copying paper are impregnated with an acid solution of prussiate of potash, and placed upon the scratched plate, which is then subjected to pressure in the copying press. An electric current passes wherever the metal has been left bare (where the writing is therefore), and the prussiate solution acting upon the iron, there is found prussiate of iron, or Prussian blue characters, corresponding to those scratched upon the plate. The number of copies that may be produced by this electro-chemical action is almost unlimited, and the formation of the Prussian blue lines is, of course, instantaneous. The patent, which is, we believe, the property of Messrs. Waterlow and Sons, forms a remarkable instance of science serving as handmaiden to the man of business.

IT will be remembered that a process of engraving by means of a forcible jet of sand was recently invented in America by Mr. Tilghman, and applied to photography, a gelatine relief being used as the mask or shield containing the design. The *Photographic News* states that a further modification has been patented by Mr. Morse, who uses a new method of propelling the sand. He provides a simple box or hopper, from which depends a small tube about 8ft. long, and no machinery whatever beyond this is used. A mixture of corundum and emery, in the form of powder, is placed in the hopper and allowed to descend through the tube. The object to be engraved is held under the extremity of the tube, so that the engraving powder will fall upon it, and in a few minutes' time the most splendid ornamental designs are cut, with marvellous exactitude and surprising beauty. An American paper says :—"We have seen engraved effects, produced by this process, upon glass and silver ware, that altogether surpass anything that has ever been attempted by the most skilled hand labour. This simple and beautiful invention promises to revolutionise the art of plate and glass engraving. By its use the adornment of all kinds of wares, in the most superb manner, may be quickly accomplished, at a tithe of the cost of the ordinary methods."

A CATALOGUE is printed of the Meteoric Collection of Mr. Charles Upham Shepard deposited in the Wood's Building of Amherst College, Mass., U.S.A. It comprises 146 litholites or meteoric stones, which are considered unquestionably authentic, from all parts of the world, the time of fall varying from the year 1492 to 1871, and 93 siderites or meteoric irons, which fell between 1735 and 1870. The total weight of the collection is above twelve hundred pounds. The heaviest iron, that of Aeriotopos, weighs 438 pounds; the smallest, that of Otsego, half an ounce. The largest entire stone, that of New Concord, weighs 52 pounds; the smallest, from Hessle, less than 50 grains. The whole number of specimens exceeds five hundred. The collection embraces, besides numerous casts, an extensive series of doubtful meteorites, in which all the principal irons and stones of this descriptionare represented.